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DISPATCH NO. WECA 60-222

22 MARCH 1960

TO: Chief, KUCLUB

INFO: Chief, MECA, Chief, EUCA, Chief, NATCA

FROM: Chief, WECA TBC

SUBJECT: General - Operational
Specific - RS-16B/AS-4 Tests - [redacted] 25X1

25X1

1. Attached is a summary of the results obtained during a series of tests between [redacted] using the RS-16B, and [redacted] base station for the AS-4. The 25X1
tests were conducted between 28 January and 11 February 1960 and the transmissions were made on an unscheduled basis throughout all periods of the day.

2. In compiling the figures on the attached chart, we used logs provided by MECA which gave us the date and time of each burst, and noted any malfunction of the RS-16B. From these and the [redacted] logs, it was possible to determine 25X1
which shots were received at corresponding times and the results of each burst. In the column listing bursts received but garbled, we have included those which were completely broken up as well as those partially useable. For instance, on 30 January, 8 bursts were fired and 8 recognized by the AS-4 but all were garbled. Two of these eight were completely unreadable but by dividing the other six bursts into three groups of two each, the second shot in each instance being a repeat of the first, it was possible to obtain three decipherable messages. In other instances, two successive bursts received may have included one completely unreadable while the second was perfect, but the fact remains it took two shots to obtain one message and it is therefore recorded accordingly. The remainder of the attachment should be self-explanatory.

3. Analyzing the bursts on a "time of transmission" basis it was noted that the best results were obtained between the hours of 0700Z and 2000Z, while the poorest were obtained between 0000Z and 0600Z, the interim hours producing variable results. During the testing period, 55 bursts were fired between the hours of 0000Z and 0600Z of which only two produced readable traffic and the times in these two cases were 0004Z and 0006Z respectively. Twenty-two bursts fired during this same period were not received at all. However, this more or less confirms our original feeling that the lowest useable frequency [redacted] on the RS-16B would not be suitable over the [redacted] path during these hours, but to cover all possibilities we included these times in the testing program. This fact should be kept in mind when plans are made for [redacted] to provide base station support for the [redacted] RS-16B circuits. If at all possible, field stations employing RS-16B's which will operate over a short path should be supplied with equipment modified to permit operation on a lower frequency. The AS-4 will cover down to 4 MC

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4. During this testing period the field and base equipment functioned well. Trouble developed with the RS-16B on 16 bursts and MECA advised that they suspected weak batteries on each occasion, including five transmissions on which the RS-16B seemed to be operating intermittently. The AS-4 functioned well throughout although the visicorder failed on five separate occasions and in each case the trouble was the same; it failed to dispense sufficient paper (hung-up as it came out of the machine).

5. Several points have also been brought to our attention regarding general procedures employed on these circuits. The identifying group (first group after the recognition pulses) must be used in every case to assist the base in recognizing immediately the station which fired the burst. During the tests these were not always received. There were also some messages in which the indicator group was missing, thereby causing a delay in breaking the traffic. Inasmuch as [redacted] was the only station testing, the inconvenience was overlooked but under operational conditions, where more than one station is operating, the resultant delays would not be acceptable if either of these two groups were omitted. 25X1

6. The results of this test series compare with those obtained in our previous efforts, averaging out to be approximately 50% successful, which is still too low to permit use of the RS-16 on an operational basis where a reliable communications circuit is essential. As in past tests, we have gained additional knowledge and worked out a few more of the bugs, but further testing is required.

7. After discussions with the MECA Operations Officer, we have agreed to arrange for a new series of tests using the two RS-16B's now located at [redacted] side by side. On the basis of the performance of the RS-16B employed on the last test series, we feel it will be advantageous to fire successive bursts using first one and then the other in an effort to determine which bursts are missed due to field equipment failures, and which may be attributed to other causes. Also, on the basis of our experiences on the base end of this test circuit, certain changes in [redacted] will be recommended. In a separate dispatch we intend to suggest that in future messages transmitted via the RS-16B, the next to the last group will be the first unused key text group immediately following the message, and that the last group will be a repeat of the station's identification group. These will provide a starting point to work backwards in deciphering a message wherein only a portion is garbled and also a double check on the originating station in the event the first group is garbled or the AS-4 is slow in recognizing. We will also recommend that more emphasis be placed upon the care which must be taken to avoid firing bursts at a channel change time. In several cases where we missed shots altogether, we feel this may have been responsible. Equipment-wise we have no recommendations at this time other than that stated above, a modification to increase the lower frequency range of the RS-16B to permit operation over short paths. Shots missed due to malfunction of the visicorder were the result of improper adjustment of the rollers through which the paper is dispensed and this has been compensated for. 25X1 25X1

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8. WEMCA will appreciate any comments and/or suggestions. As indicated above, further tests are planned and you will be advised of the results.

FOR THE CHIEF, WEMCA

[redacted] 25X1

Enclosure:
RS-16B AS-4 Tests - [redacted] 25X1

Distribution:
3 - KUCLUB w/encl. (1)
1 - MECA w/encl. (1)
1 - EUCA w/encl. (1)
1 - NATCA w/encl. (1)

DATE	BURSTS FIRED	AS-4 RECOGNIZED	MESSAGES READABLE AFTER ONE BURST	MESSAGES READABLE AFTER TWO BURSTS	BURSTS RCVD GARBLED	RS-16 MALFUNCTION	BURSTS NOT RCVD	REMARKS
28	4	1	1	0	0	3	3	
29	7	3	1	1	2	0	4	Two bursts received garbled is one msg list as readable after two bursts
30	8	8	0	3	8	0	0	All bursts rcvd but garbled - 6 successive bursts gave 3 readable messages
31	13	8	0	1	7	11	5	Weak battery and intermittent RS-16B
01	9	9	1	1	8	0	0	8 garbled includes two readable when combined
02	4	3	0	0	3	0	1	Burst not rcvd fired close to channel change time
03	5	5	3	0	2	0	0	
04	11	7	2	1	4	2	4	MECA suspected weak battery on two shots
05	5	5	1	1	2	0	0	Visicorder hung up on two bursts
06	10	7	2	0	5	0	3	On two bursts only 2 feet paper came out. 3 bursts contained nothing but "RY's".

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US-16

DATE	BURSTS FIRED	AS-4 RECOGNIZED	USABLE READABLE AFTER ONE BURST	USABLE READABLE AFTER TWO BURSTS	BURSTS RCVD GARBLED	ALTITUDE	BURSTS NOT RCVD	REMARKS
07	9	6	0	2	5	0	3	Of two rcvd after 2 bursts first burst no good - second OK
08	7	7	3	0	4	0	0	First four bursts looked good but text was "RY's".
09	7	6	2	0	4	0	1	Visicorder hung up on one shot. Three mags produced "RY's".
10	13	13	4	0	9	0	0	Two bursts gave more "RY's". QRI broke up most shots.
11	12	6	3	1	1	0	6	
TOTALS								
	124	94	23	11	62	16	30	
PERCENTAGE		75.8	18.5	8.8	50	12.9	24.2	

NOTE: Percentages all based on total number shots fired.

Note #2: Excluding bursts fired 0000 - 0600Z, the totals and percentages are as follows:

	69	61	21	11	31	5	8
PERCENTAGE		88.4	30.4	16	45	7.2	11.6

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